

Amendment
Serial No. 10/531,731
Attorney Docket No. 052474

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended): An internal combustion engine with at least one engine member, the engine member including:
 - a combustion chamber of a combustible mixture with fuel and oxidant components fitted with a compression system,
 - an ignition system of the combustible mixture by an igniter,
 - sequential let-through devices for the fuel and oxidant components and for the combustion products,

_____ the engine being of the supercharging type by boost pressure of the oxidant components upstream of the engine member,

_____ wherein the fuel is exclusively liquid, ~~notably petrol~~, and the ignition system includes a closed head substantially spherical with a wall enclosing the igniter in a precombustion chamber, the head including a set of orifices intended to communicate the combustion chamber and the precombustion chamber so that combustible mixture may flow into the precombustion chamber,

_____ wherein at least one orifice has dimensions of passageway not letting through a flame front from the precombustion chamber to the combustion chamber while letting through unstable

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species resulting from the combustion in the precombustion chamber in order to enable self-ignition of the combustible mixture of the combustion chamber.

2. (Previously presented): An engine according to claim 1, wherein at least one orifice has dimensions of passageway letting through a flame front from the precombustion chamber to the combustion chamber.

3. (Canceled)

4. (Currently amended): An engine according to claim 3 1, wherein the set of orifices have dimensions of passageway not letting through the flame front from the precombustion chamber to the combustion chamber while letting through unstable species.

5. (Currently amended): An engine according to claim 3 1, wherein each orifice not letting through the flame front has a diameter smaller than 1 mm.

6. (Currently amended): An engine according to claim 3 1, wherein each orifice has a length smaller than its diameter.

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7. (Previously presented): An engine according to claim 1, wherein the separation wall between the precombustion chamber and the combustion chamber of the head is made of a material with thermal conductivity greater than 10W/K/m.

8. (Previously presented): An engine according to claim 1, wherein the separation wall between the precombustion chamber and the combustion chamber of the head is made of high conductivity copper alloy (CuCr1Zr).

9. (Previously presented): An engine according to claim 1, wherein the orifices of the precombustion chamber of the head are minimum three in number.

10. (Previously presented): An engine according to claim 1, wherein it is with direct injection of the fuel components in the combustion chamber.

11. (Previously presented): An engine according to claim 10, wherein the compression system is a piston in a cylindrical combustion chamber with central axis, at least one of the let-through devices being a direct injector in the combustion chamber for, in all or in part, the fuel and/or oxidant components, the injector being arranged substantially axially opposite the piston and the ignition system laterally with respect to the injector, and the orifices are predominantly

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arranged axially to ensure homogeneity of the combustion of the combustible mixture substantially in the whole combustion chamber.

12. (Previously presented): An engine according to claim 1, wherein the compression system is a piston in a cylindrical combustion chamber with central axis, at least one of the let-through devices being a direct injector in the combustion chamber for, in all or in part, the fuel and/or oxidant components, the ignition system being arranged substantially axially opposite the piston and the injector laterally with respect to the ignition system, and the orifices are distributed regularly on the surface of the head to ensure homogeneity of the combustion of the combustible mixture substantially in the whole combustion chamber.

13. (Previously presented): An engine according to claim 1, wherein the compression system is a piston in a cylindrical combustion chamber with central axis, at least one of the let-through devices being a direct injector in the combustion chamber for, in all or in part, the fuel and/or oxidant components, the injector and the ignition system being arranged laterally with respect to said axis, and the orifices are predominantly arranged axially to ensure homogeneity of the combustion of the combustible mixture substantially in the whole combustion chamber.

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14. (Previously presented): An engine according to claim 1, wherein the head is arranged on a portion of the path of the fuel components injected so that said head may be wetted by said fuel components during the direct injection thereof.

15. (Previously presented): An engine according to claim 10, wherein the richness of the mixture is greater than or equal to one in at least one embodiment of the engine.

16. (Previously presented): An engine according to claim 1, wherein the ignition system and its head are a single component which replaces a traditional sparking plug and which does not require any modification of the cylinder head passageway for the sparking plug.

17. (Currently amended): A method of ignition of an internal combustion engine having at least one engine member, the engine member including:

- a combustion chamber of a combustible mixture with fuel and oxidant components fitted with a compression system,
- an ignition system of the combustible mixture by an igniter,
- sequential let-through devices for the fuel and oxidant components and for the combustion products,

the engine being of the supercharging type by boost pressure of the oxidant components upstream of the engine member,

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wherein

- ~~one implements an~~ the ignition system ~~including~~ includes a closed head substantially spherical with a wall enclosing the igniter in a precombustion chamber, the head including a set of orifices ~~intended~~ adapted to communicate the combustion chamber and the precombustion chamber so that combustible mixture may flow into the precombustion chamber,

said method comprising:

- ~~one introduces~~ introducing in the combustion chamber the fuel components and the oxidant components which form the combustible mixture in the combustion chamber, the fuel being exclusively liquid, ~~notably petrol~~,

- ~~one causes~~ causing an ignition of the combustible mixture in the precombustion chamber by the igniter, the orifices of the precombustion chamber enabling the ignition of the combustible mixture of the combustion chamber,

said method comprising letting through the orifices unstable species resulting from the combustion in the precombustion chamber in order to enable self-ignition of the combustible mixture of the combustion chamber without however letting through a flame front from the precombustion chamber to the combustion chamber.

18-19. (Canceled)

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20. (New): An engine according to claim 1, wherein the fuel component is petrol.

21. (New): An internal combustion engine with at least one engine member, the engine member including:

- a combustion chamber of a combustible mixture with fuel and oxidant components fitted with a compression system,
- an ignition system of the combustible mixture by an igniter,
- sequential let-through devices for the fuel and oxidant components and for the combustion products,

the engine being of the supercharging type by boost pressure of the oxidant components upstream of the engine member,

wherein the fuel is exclusively liquid, and the ignition system includes a closed head substantially spherical with a wall enclosing the igniter in a precombustion chamber, the head including a set of orifices intended to communicate the combustion chamber and the precombustion chamber so that combustible mixture may flow into the precombustion chamber,

wherein the ignition system and its head are a single component which replaces a traditional sparking plug and which does not require any modification of the cylinder head passageway for the sparking plug.

22. (New): An engine according to claim 21, wherein the fuel component is petrol.